

Exhibit 1

**UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION**

MONTEVILLE SLOAN, JR., RAUL
SIQUEIROS, TODD AND JILL CRALLEY,
JOSEPH BRANNAN, LARRY GOODWIN,
MARC PERKINS, THOMAS SHORTER,
DERICK BRADFORD, GABRIEL DEL
VALLE, KEVIN HANNEKEN, EDWIN
AND KATELYN DOEPEL, DAN
MADSON, JAMES FAULKNER, JOSEPH
OLIVIER, SCOTT SMITH, ROSS DAHL,
DREW PETERSON, MICHAEL WARE,
STEVE KITCHEN, JOHN KNOLL,
BARBARA MOLINA, DENNIS VITA,
WILLIAM DAVIS, JR., THOMAS SZEPE,
MIKE WARPINSKI, WILLIAM
MARTELL, JOHN GRAZIANO, JOSHUA
BYRGE, RUDY SANCHEZ,
CHRISTOPHER THACKER, KELLY
HARRIS, JAMES ROBERTSON, and
JONAS BEDNAREK, individually and on
behalf of all others similarly situated,

Plaintiffs,

v.

GENERAL MOTORS LLC,

Defendant.

Case No.: 16-cv-07244-EMC

**RULE 26(a)(2) SUPPLEMENTAL EXPERT
REPORT OF JEFFREY K. BALL**

Assignment

Plaintiffs' counsel received additional warranty claim data from GM. Counsel asked me to analyze the updated data and to calculate the warranty claim rate for each of the engines contained in the Class Vehicles. The facts and data that I relied upon in forming the opinions expressed in this Report are listed in Appendix A.

Discussion of Findings

Based on my investigation and analysis, the following was determined:

Analysis of Warranty Claims by Engine Type Based on GM's Provided Data

GM provided warranty claim data related to the replacement of piston, connecting rod, bearing, and/or piston rings for the following engine types:

LC9 – Aluminum block with active fuel management (AFM)
 LMG – iron block with AFM
 LH9 – aluminum block without AFM
 LMF – iron block without AFM

The provided warranty claim data was analyzed to determine the number of occurrences for model years 2010 through 2014 on each engine type. GM also provided spreadsheets showing annual sales numbers for each type of engine (GM-000000001 – GM-000000005). Utilizing the sales numbers, combined with the relevant warranty occurrences, the warranty rate was calculated as a percentage of total sales. The results of this analysis are shown in Table 1.

Table 1. Cumulative Reported Piston Assembly Replacement Warranty Claim Rates for Affected Engines 2010-2014

Engine	Total sales	Warranty Claims	Claim Rate [%]
LC9	997,681	31,962	3.20%
LMG	854,377	1,720	0.20%
LH9	7,468	17	0.23%
LMF	35,932	18	0.05%

In order to identify year-to-year warranty trends, the warranty rates for each year, and for each engine type, were also calculated. Table 2 shows the annual warranty rates for each engine type. Table 3 shows the supporting data of annual sales while Table 4 shows the supporting data of warranty claims resulting in piston assembly replacement.

Table 2. Year-to-Year Piston Assembly Replacement Warranty Trends for Each Engine Type

Engine	2010	2011	2012	2013	2014
LC9	4.10%	3.35%	2.51%	3.29%	0.81%
LH9	0.33%	0.26%	0.08%	N/A	N/A
LMF	0.03%	0.02%	0.01%	0.04%	0.13%
LMG	0.20%	0.14%	0.12%	0.20%	0.65%

Table 3. Annual Sales for Each Engine Type

Engine	2010	2011	2012	2013	2014
LC9	167,087	298,817	203,050	277,875	23,852
LH9	2,714	2,347	2,407	N/A	N/A
LMF	7,071	6,552	6,944	6,826	8,539
LMG	142,697	248,119	174,514	227,640	61,407

Table 4. Year-to-Year Warranty Claims for Piston Assembly Replacement

Engine	2010	2011	2012	2013	2014
LC9	6852	10000	5779	9137	194
LH9	9	6	2	N/A	N/A
LMF	2	1	1	3	11
LMG	287	358	216	460	399

GM provided a document titled “GenIV V8 Oil consumption field fix cost progression” outlining the costs associated with steps they had taken to address the warranty claims for excessive oil consumption. The document states, “*Step 1: AFM Shield & Piston Cleaning only=\$ 574 @ 2.2% Total Fail Rate (last pull 8/2011). Most warranty claims fall into this category.*”¹ The document then states, “*Step 2 (if Step 1 not clean kill): Replace pistons & rings= \$2,700@ 27% of the population that received Step 1 first.*”²

Based on the provided GM documentation, the warranty claim chart provided represents only 27% of the total claims related to excessive oil consumption. Therefore, the warranty claims contained in Table 1 can be combined with GM’s additional documentation to estimate the number of warranty complaints related to excessive oil consumption. The results of this analysis are contained in Table 5.

¹ GM-000575234

² GM-000575234

Table 5. Cumulative Estimated Warranty Claims for Excessive Oil Consumption Based on GM Documentation 2010-2014

Engine	Total sales	Warranty Claims	Claim Rate [%]
LC9	997,681	118,378	11.87%
LMG	854,377	6,370	0.75%
LH9	7,468	63	0.84%
LMF	35,932	67	0.19%

By the same logic, the year-to-year warranty trends for each engine are shown in Table 6.

Table 6. Year-to-Year Cumulative Estimated Warranty Trends for Excessive Oil Consumption for Each Engine Type

Engine	2010	2011	2012	2013	2014
LC9	15.19%	12.39%	9.30%	12.18%	3.01%
LH9	1.23%	0.95%	0.31%	N/A	N/A
LMF	0.10%	0.60%	0.50%	0.16%	0.48%
LMG	0.74%	0.53%	0.46%	0.75%	2.41%

It is clear from the preceding analysis that the LC9 engine had more warranty claims than the other 3 engine types combined. However, all four engine types experienced warranty claims for excessive oil consumption. It is also apparent that although GM attempted to mitigate the excessive oil consumption by applying an AFM shield (breakpoint 10/2010) and a redesigned PCV baffle (break point 02/2011), the warranty rates did not show substantial reduction. As such, it is evident that neither the AFM shield nor the PCV baffle addressed the root cause of the excessive oil consumption defect.

Conclusions

Based upon my training, education and experience, and the materials I reviewed in connection with this analysis, I have reached the following conclusions:

- The LC9 engine has a significantly higher rate of warranty claims than the other 3 engine types.
- All of the engine types were brought in with claims of excessive oil consumption, and 27% of those had piston replacement.
- The warranty rates after the implementation of the AFM shield and the PCV baffle did not show substantial reduction.

The opinions and conclusions expressed in this report are based on the information available to this engineer as of the date of this report.

Sincerely,



Jeff Ball, Ph.D., P.E.
Principal Engineer
Veritech Consulting Engineering, LLC.

Appendix A – List of Relied Upon Documents

GM Production Documents

GM-000000001
GM-000000002
GM-000000003
GM-000000004
GM-000000005
GM-00-0575234